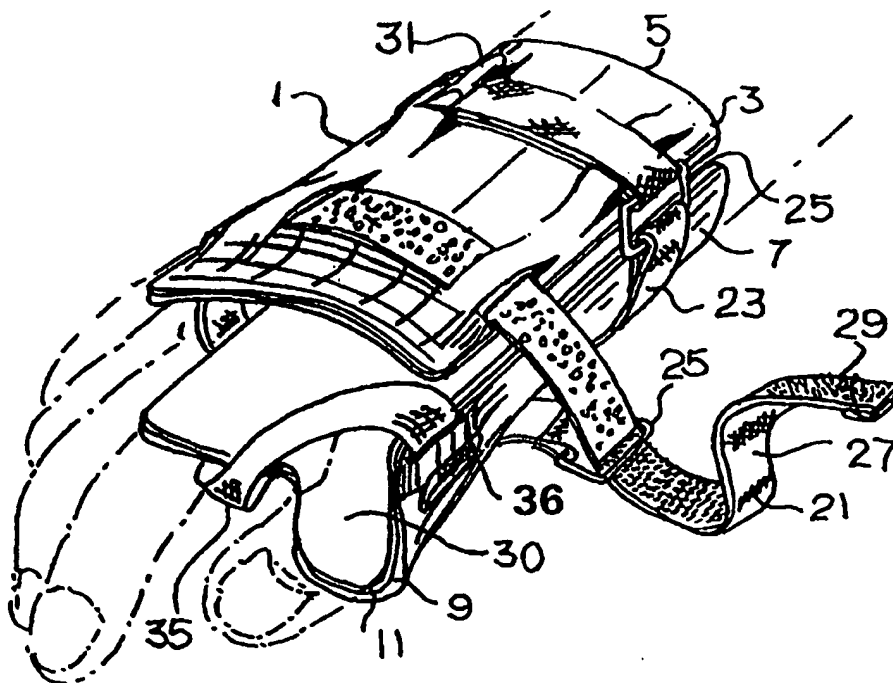




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: PROTECTIVE GUARD OF THE FOREARM AND WRIST



## (57) Abstract

The present invention is a protective guard for use during sports such as snowboarding. It comprises a substantially rigid dipartite sleeve adapted to receive the distal forearm, wrist and proximal portion of a hand; thumb receiving region at one end of the sleeve to receive and partially surround the base of the thumb of a user; and retaining straps to hold the sleeve on the arm of a user.

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## PROTECTIVE GUARD OF THE FOREARM AND WRIST

## FIELD OF THE INVENTION

5 The present invention relates to the field of arm and wrist protective guards for use during sports and other activities.

## BACKGROUND OF THE INVENTION

10 The increasing popularity of sports such as snowboarding has resulted in an increase in associated injuries. In particular, fractures of the bones in the forearm and wrist such as the radius, ulna and lateral carpal bones are common. Similarly, disruption of the collateral ligaments of the thumb is common. These  
15 injuries result partly from the design of snowboards. Snowboards attach to the boots of a user and do not release the boots when the user falls. If a user falls, then the force of the fall will often be absorbed primarily by the user's arms. This type of fall results in serious injuries  
20 to unsupported and unprotected forearms and wrists.

One type of protective device is disclosed in United States Patent No. 4,011,596 issued March 15, 1977 to Chang. This patent disclosed a forearm and wrist protector for use, in particular, by skate boarders. This protector  
25 comprises a rigid, unitary, impact absorbing splint member which overlies the forearm and wrist of the wearer. The protector extends from the elbow to the metacarpophalangeal joint. It may also comprise first and second splint members hinged together at the wrist for flexing of the wrist. A  
30 disadvantage of this type of device is that it is a cumbersome full sleeve arrangement which does not allow the user a full range of movement. The device has a limited range of adjustment and can become uncomfortable and warm with long periods of wear.

35 Another device is disclosed in United States Patent No. 4,190,902 issued to Rhee on March 4, 1980. This device comprises a longitudinal member made of resilient material

such as plastic foam, with one end contoured to cradle the user's elbow and the other end contoured to receive the palm and hand of the wearer. This device provides little protection if the user does not fall flat on the underside of the forearm. It is easily dislocated, thereby  
5 drastically reducing protection to the forearm.

Other devices include protectors made from soft pliable material. While these devices may provide some cushioning to the user's forearm as it contacts the ground, they generally do not provide support and little impact  
10 absorption. As a result, the user often receives significant injuries including fractures.

There, therefore, is a need for an improved protective guard which is light weight, adjustable to the size of the user's arm and maintains a proper position thereon.  
15

There is also a need for an improved protective guard which provides support and absorbs impact during a fall to prevent and reduce injuries to the forearm and wrist of a user.

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#### **SUMMARY OF THE INVENTION**

It is therefore an object of the present invention to overcome the disadvantages of the prior art and provide an effective protective device for the forearm of a user.

25 The invention therefore provides a protective guard for protecting the forearm and wrist of a user comprising a substantially rigid sleeve adapted to receive the distal forearm, wrist and proximal portion of the hand of a user; thumb receiving means at one end of said sleeve, said thumb  
30 receiving means generally conforming to the shape of the base of the thumb of a user for receiving the base of the thumb into said means; and retaining means to hold said sleeve onto said forearm and wrist of a user.

In another aspect of the present invention, there is  
35 provided a protective guard for protecting the forearm and wrist of a user comprising an elongate sleeve comprised of a first and second member, said sleeve adapted to receive

the forearm, wrist and proximal portion of the hand of a user and having a substantially rigid layer; thumb receiving means at one end of said sleeve for receiving and partially surrounding the base of the thumb of a user; retaining means for engaging said first and second member for holding said sleeve on the forearm of a user; and band means for receiving and maintaining said retaining means on said sleeve.

#### 10 BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention will now be described and may be better understood when read in conjunction with the following drawings in which:

15 Figure 1 is a perspective view of one embodiment of the present invention.

Figure 2 is a side view of the guard shown in Figure 1.

Figure 3 is a top view of the front piece of the guard shown in Figure 1.

20 Figure 4 is a top view of the rear piece of the guard shown in Figure 1.

Figure 5 is a perspective view of a further embodiment of the present invention.

25 Figure 6 is a side view of the guard shown in Figure 5.

Figure 7 is a top view of the front piece of the guard shown in Figure 5.

Figure 8 is a top view of the rear piece of the guard shown in Figure 5.

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#### DETAILED DESCRIPTION OF THE INVENTION

With reference to the figures, there is provided a guard 1 for protecting the forearm and wrist of a user preferably for use during sports such as snowboarding. The guard 1 is comprised of a sleeve 3 having a first and second member 5,7 and straps 21,23 to retain the sleeve 3 on the arm of a user. The sleeve 3 extends from the middle

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portion of the forearm of a user up to the metacarpal region in the hand of the user. The sleeve 3 is contoured to comfortably receive the distal forearm, wrist, and proximal hand of a user. The first member 5 of the guard 1 may incorporate a raised, angled portion as shown in Figure 2 at either or both ends. This portion is raised at approximately a 10° angle to the main section of the member for approximately the terminal two centimetres of the member. This portion allows for some flexing and movement of the hand and arm of the user. Because the sleeve 3 is made of two distinct pieces, the first and second members 5,7, it is easily adjustable to fit different users. The guard 1 is preferably worn over the user's clothing for ease in use and adjustment.

Each member 5,7 has a substantially rigid layer 9 on its outer surface. The substantially rigid layer 9 of the member 5,7 absorbs impact and thereby provides protection to the covered portions of the user's distal forearm, wrist and hand, helping to prevent fractures of the bones in these regions. Preferably, the guard 1 includes a cushioning layer 11 on the inner surface of the guard 1. This layer 11 increase the comfort to a user when wearing the guard 1 and increases the ease of donning and removing the guard 1. It may also provide an impact-absorbing benefit.

The first and second members 5,7 of the sleeve 3 of the guard 1 are attached together surrounding the forearm, wrist and hand of the user by any suitable means. In the embodiment shown in Figures 1 and 2, two velcro bands 17, 19 are attached to the outer surface of each of the members 5,7. The bands 17,19 are aligned relatively parallel across the width of the members 5,7. Each velcro band 17,19 has a hook side facing outward. Two long velcro straps 21, 23 each having a buckle 25 at one end, encircle the first and second members 5,7, wrap through their buckle 25 and double back onto themselves. Each of these straps 21 has a first side 27 which is a pile layer and a second side 29

which incorporates a hook layer for part of the strap and a pile layer for part of the strap 21, 23. The first side 27 of these straps 21, 23 interacts with the hook side of the bands 17, 19 attached to each of the members 5, 7. As the straps 21, 23 pass through their own buckle 25 and are folded back on themselves, the hook layer of the second side 29 interacts with the pile layer of the second side 29 thereby fixing the straps 21, 23 and members 5, 7 in place. As is readily apparent, the hook and pile velcro layers may be reversed. This arrangement of the straps 21, 23 increases the strength of the hold of the straps 21, 23 around the members 5, 7 and allows for easy adjustment of the protective guard 1 on the arm of a user. Each of these straps 21, 23 may also have additional material at their terminal ends opposite from the attached buckle or the ends may be doubled back onto themselves. This end provides for a small bulky portion 31 which helps to prevent the end of the strap from slipping out of the buckle while the strap is being adjusted.

In a preferred embodiment shown in Figures 5 and 6, the members 5, 7 each have two rows having two band portions 41 cut into the member surface. These band portions 41 are preferably integrally formed as part of the members 5, 7 but may consist of separate pieces attached to the outer surface of the members. These band portions 41 are defined by raised sections of the members 5, 7 and have slit openings 42 on each side providing a passage under the band portion 41 through which one of the velcro straps 21, 23 may pass. After the velcro straps 21, 23 pass under their respective band portions 41, the straps 21, 23 may then pass through their buckle 25 and double back onto themselves as described above. This arrangement of passing under the band portions 41 allows the user to adjust the members 5, 7 and the straps 21, 23 more easily.

A further feature of the guard 1 is the thumb receiving region 30. At one end of the second member 7 is an area contoured similarly to the base of a user's thumb.

When the protective guard 1 is slipped over the forearm of a user, the guard 1 is properly positioned by placing the base of the user's thumb within this region 30.

5 The guard 1 may also include a retaining band 35. This band 35 attaches to the outer edge of the thumb receiving region 30 and extends across the thumb receiving region 30 between the user's thumb and palm. The band 35 may be affixed to the rear member 7 in any suitable manner and may be permanently or temporarily affixed at either ends. In 10 the embodiment shown in Figures 1-4, it is permanently affixed to the outer edge of the thumb receiving region 30 by a rivet 33 and, at its other end, it has a velcro band 39 to removably interact with the velcro band 17 and/or strap 21 on the rear member 7. The retaining band 35 may 15 also have a rubber sleeve 37 or other cover on the portion of the band 35 which passes between a user's thumb and palm. This rubber covering 37 allows for greater comfort of the user and helps to reduce wear and tear on the retaining band 35. The retaining band 35 is used to position the 20 guard 1 in its proper place on the forearm of the user and to retain the guard 1 in place during use.

In the preferred embodiment shown in Figures 5-8, the retaining band 35 attaches to the outer edge of the thumb receiving region by passing through a slot 36 on the outer 25 surface of the thumb receiving region 30. Alternatively, the slot may be placed in the member 7 or through the thumb receiving region 30. The band 35 may include a large, knob portion on its outer end to engage the slot 36 or other alternatives may be used to engage the band 35 in the slot 30 36. The retaining band 35 extends across the thumb receiving region between the user's thumb and palm. The band 35 may be affixed to the rear member 7 by interacting with the strap 21 and may have a corresponding velcro surface for attaching to the velcro layer on the underside 35 of the strap 21 as shown in Figure 8.

The above-described embodiments of the present invention are meant to be illustrative of preferred



embodiments of the present invention and are not intended to limit the scope of the present invention. Various modifications, which would be readily apparent to one skilled in the art, are intended to be within the scope of the present invention. The only limitations to the scope of the present invention are set out in the following appended claims.

EMBODIMENTS IN WHICH AN EXCLUSIVE PROPERTY AND PRIVILEGE ARE CLAIMED ARE AS FOLLOWS:

1. A protective guard for protecting the forearm and wrist of a user comprising:

a substantially rigid sleeve adapted to receive the distal forearm, wrist and proximal portion of the hand of a user;

thumb receiving means at one end of said sleeve, said thumb receiving means generally conforming to the shape of the base of the thumb of a user for receiving the base of the thumb into said means; and

retaining means to hold said sleeve onto said forearm and wrist of a user.

2. A protective guard according to claim 1 wherein said rigid sleeve comprises at least two members.

3. A protective guard according to any one of the preceding claims wherein said retaining means comprises at least one strap adapted to attach to and extend between said first and second members for holding said members on the forearm of a user.

4. A protective guard according to any of the preceding claims wherein said retaining means comprises at least one strap for encircling said sleeve for holding said sleeve on the forearm and wrist of a user.

5. A protective guard according to any of the preceding claims wherein said retaining means comprises a first and second strap, said first strap attachable to said sleeve and said second strap removably attachable to said first strap for positioning and adjusting said sleeve on the forearm of a user.

6. A protective guard according to any of the preceding claims further comprising cushioning means attached to said rigid sleeve.

7. A protective guard according to any of the preceding claims further comprising a retainer band attached to said sleeve and extending across said thumb receiving means for maintaining said sleeve in position on the forearm of a user.

8. A protective guard for protecting the forearm and wrist of a user comprising:

an elongate sleeve comprised of a first and second member, said sleeve adapted to receive the forearm, wrist and proximal portion of the hand of a user and having a substantially rigid layer;

thumb receiving means at one end of said sleeve adapted to receive and partially surround the base of the thumb of a user;

retaining means engaging said first and second member for holding said sleeve on the forearm of a user; and

band means on said members for receiving and maintaining said retaining means on said sleeve.

9. A protective guard according to claim 8 further comprising a retainer band attached to said sleeve and extending across said thumb receiving means for maintaining said sleeve on the forearm of a user.

10. A protective guard according to claim 8 or 9 wherein said retaining means comprises at least one strap adapted<sup>s</sup> to attach to and extend between said first and second member for holding said members on the forearm of a user.

11. A protective guard according to claims 8, 9, or 10 wherein said retaining means comprises at least one strap

for encircling said sleeve for holding said sleeve on the forearm and wrist of a user.

12. A protective guard according to claims 8, 9, 10 or 11 wherein said band means comprises at least one opening in said members for receiving and maintaining said straps on said members.

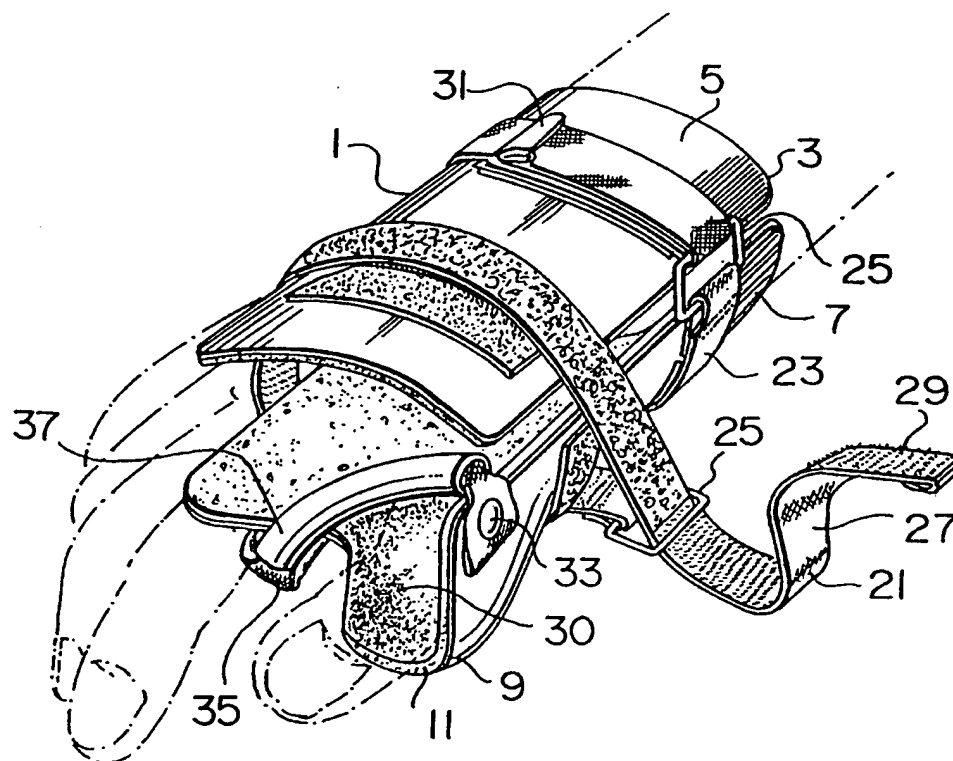


FIG. 1

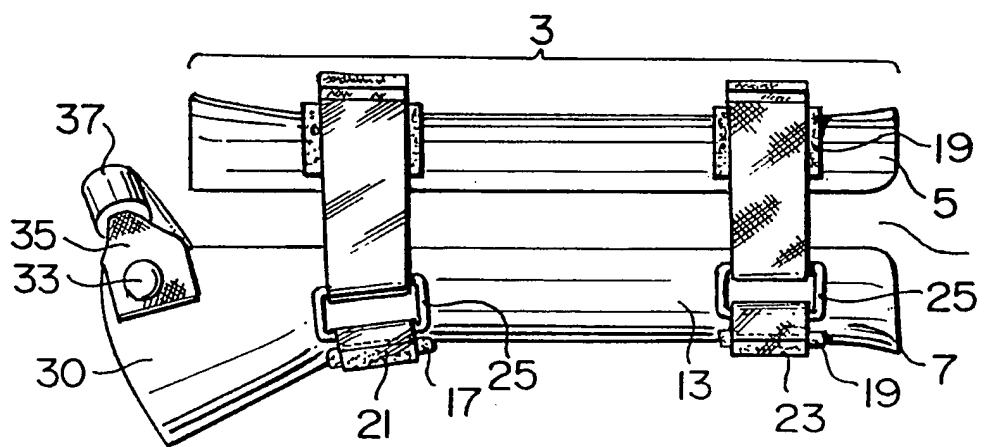


FIG. 2

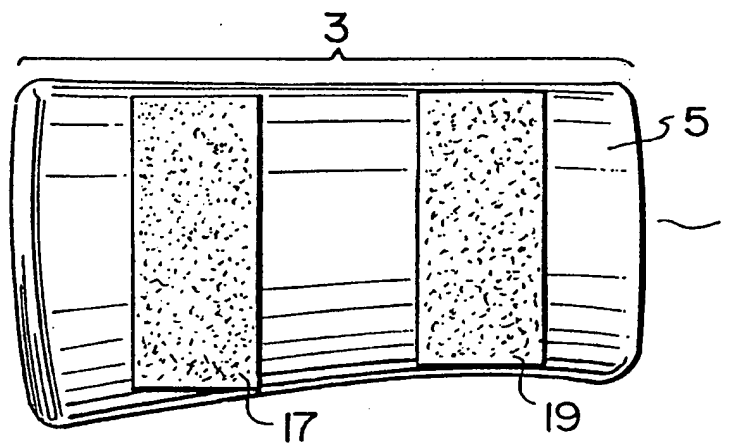


FIG. 3

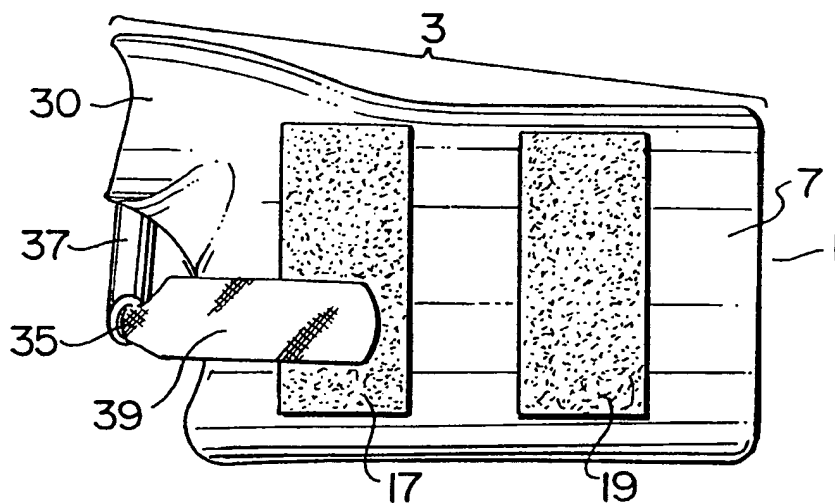


FIG. 4

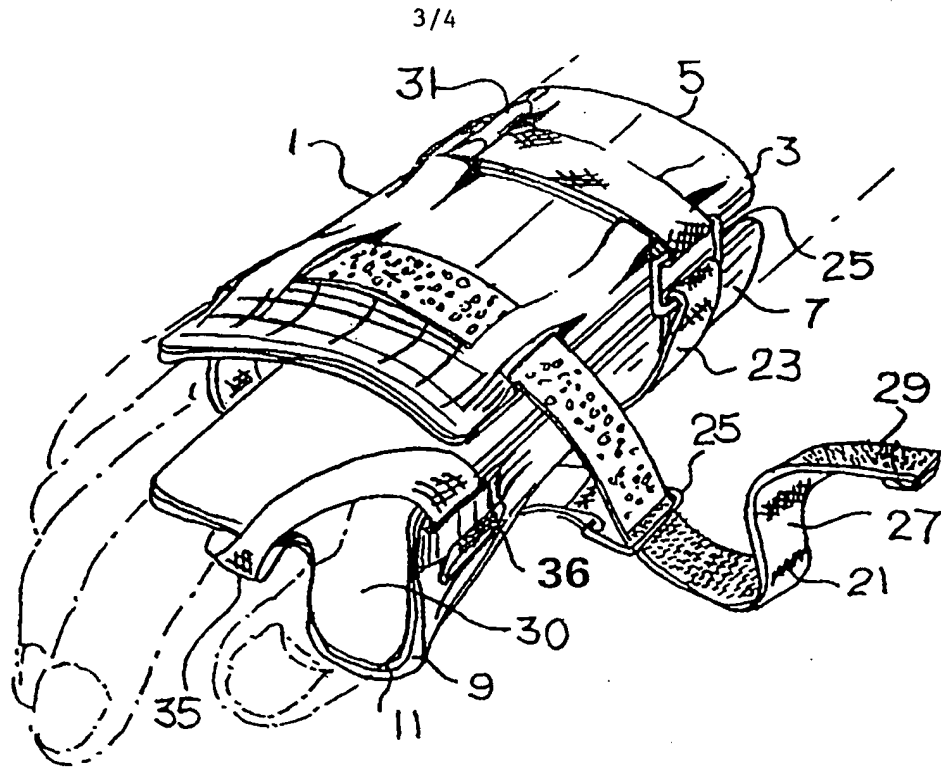


FIG. 5

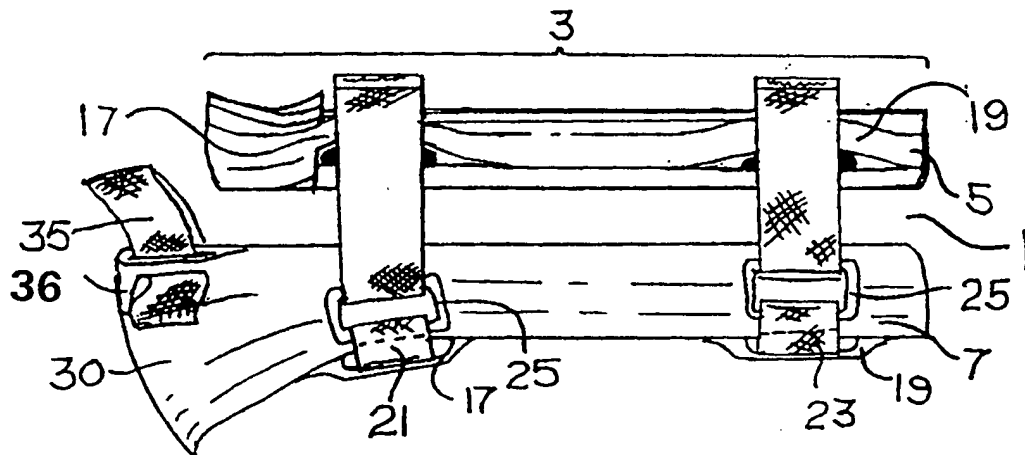


FIG. 6

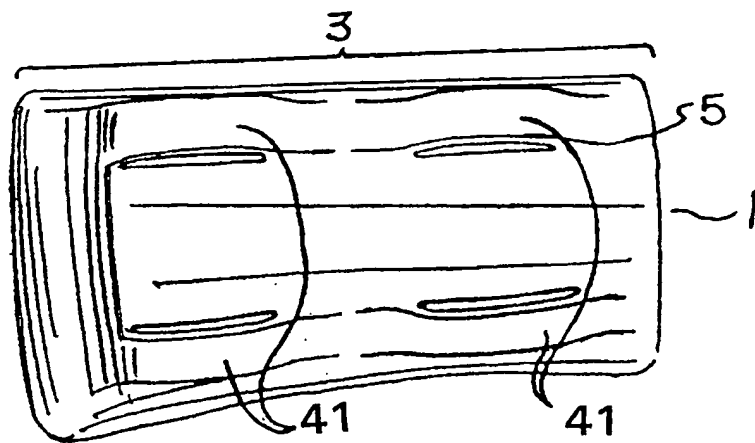


FIG. 7

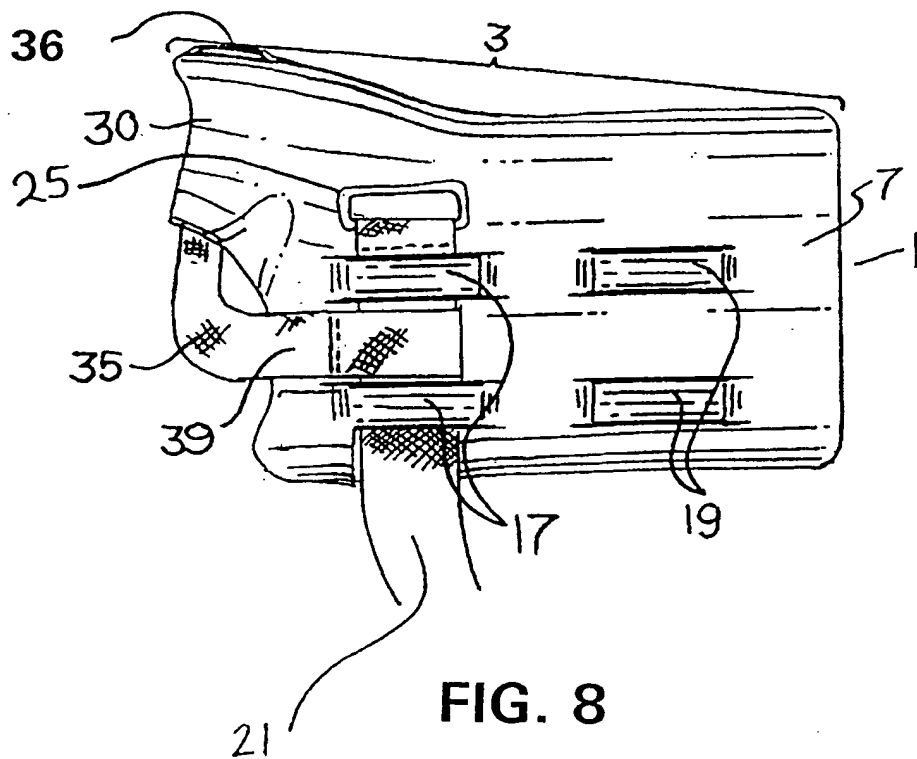


FIG. 8



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 97/00786

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 A41D13/08 A61F5/01

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A41D A63B A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|------------|--|-----------------------|
| X          | US 5 526 531 A (O. S. DESIGNS INC.) 18 June 1996<br>see column 1, line 52 - column 3, line 49;<br>figures 1-5                      | 1,3                   |
| X          | US 5 279 545 A (J. L. REESE) 18 January 1994<br>see column 3, line 16 - column 4, line 53;<br>figures 1-4                          | 1-3                   |
| X          | US 4 011 596 A (E. C. CHANG) 15 March 1977<br>cited in the application<br>see column 2, line 1 - column 3, line 38;<br>figures 1-5 | 1                     |
| A          | US 5 313 667 A (N. D. LEVINE) 24 May 1994<br>see column 3, line 8 - column 4, line 34;<br>figures 1-3                              | 1,3                   |

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

18 February 1998

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

I. International Application No

PCT/CA 97/00786

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------------------|----------------------------|---------------------|
| US 5526531 A                              | 18-06-96            | NONE                       |                     |
| US 5279545 A                              | 18-01-94            | NONE                       |                     |
| US 4011596 A                              | 15-03-77            | NONE                       |                     |
| US 5313667 A                              | 24-05-94            | NONE                       |                     |